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Richard Henry Dee

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EXAMINER

CASTRO, ANGEL A

ART UNIT

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Paper No. 13

Application Number: 09/894,379

Filing Date: June 29, 2001

Appellant(s): DEE ET AL.

Patrick C. R. Holmes
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 3/26/04.

(1) *Real Party in Interest*

A statement identifying the real party in interest is contained in the brief.

(2) *Related Appeals and Interferences*

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) *Status of Claims*

The statement of the status of the claims contained in the brief is correct.

(4) *Status of Amendments After Final*

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) *Summary of Invention*

The summary of invention contained in the brief is correct.

(6) *Issues*

The appellant's statement of the issues in the brief is correct.

(7) *Grouping of Claims*

Appellant's brief includes a statement that claims 1-36 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) *Claims Appealed*

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

5,748,416	Tobise et al	05/1998
5,852,533	Miyauchi et al.	12-1998

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-6, 10-16 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Tobise et al (U.S. Pat. 5,748,416).

Regarding claims 1 and 11, Tobise et al discloses a reduced sensitivity spin valve sensor apparatus (figure 15), comprising:

a spin valve sensor; and

at least one magnetic effect inducing device 21,

wherein the at least one magnetic effect inducing device induces a magnetic field to the spin valve sensor to thereby reduce a sensitivity of a free layer of the spin valve sensor to applied magnetic fields (column 14, lines 45-48 and 15-21).

Regarding claims 2 and 12, Tobise discloses that the at least one magnetic effect inducing device is at least one permanent magnet (column 14, lines 40-42 and 8-9).

Regarding claim 3-5, 13-15, Tobise shows that the at least one magnetic effect inducing device is a pair of permanent magnet stabilizing elements 21 formed of cobalt-platinum/chromium magnets (see column 13, line 67, and figure 15).

Regarding claims 6 and 16, Tobise discloses that the at least one magnetic effect inducing device reduces the spin valve sensor's propensity to saturate (column 14, lines 21-27).

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Regarding claims 10 and 20, Tobise discloses at least one insulating film 42; and at least one magnetic shield 52, wherein the insulating film is alumina (column 13, lines 62-63).

Claims 1, 7-9, 11, 17-19, 21-36 are rejected under 35 U.S.C. 102(b) as being anticipated by Miyauchi et al (U.S. Pat. 5,852,533).

Regarding claims 1 and 11, Miyauchi et al discloses a reduced sensitivity spin valve sensor apparatus (figures 3-4), comprising:

a spin valve sensor; and

at least one magnetic effect inducing device 126,

wherein the at least one magnetic effect inducing device induces a magnetic field to the spin valve sensor to thereby reduce a sensitivity of a free layer 121 of the spin valve sensor to applied magnetic fields (column 7, lines 58-64).

Regarding claims 7 and 17, Miyauchi discloses that the at least one magnetic effect inducing device is an antiferromagnet layer (column 7, lines 44-46).

Regarding claims 8-9 and 18-19, Miyauchi discloses that the antiferromagnet layer generate a longitudinal exchange induced bias field in the free layer that reduces the sensitivity of the free layer to applied magnetic fields (column 7, lines 58-66).

Regarding claims 21 and 29, Miyauchi discloses that the at least one magnetic effect inducing device includes a pair of antiferromagnetic layers 124, 126 (see figures 3 and 4).

Regarding claims 22-24 and 30-32, Miyauchi shows that the pair of antiferromagnetic layers includes an antiferromagnetic layer 126 that pins a ferromagnetic layer at zero degrees relative to a long axis of the free layer and an antiferromagnetic layer 124 that pins a ferromagnetic layer at ninety degrees relative to a long axis of the free layer 121 (see figure 4).

Regarding claims 25 and 33, Miyauchi discloses that the first and second antiferromagnetic layers have different blocking temperatures (column 8, lines 52-63).

Regarding claims 26 and 34, Miyauchi shows a ferromagnetic layer 123 spaced from the free layer 121 by a nonmagnetic layer 122 (see figure 3).

Regarding claims 27-28 and 35-36, since the thickness of the spacer layer of Miyauchi is the same as Applicant's, it is inherent that the thickness of the nonmagnetic layer is used to control the ferromagnetic exchange between the ferromagnetic layer and the free layer.

(11) *Response to Argument*

Appellant asserts in page 4, last two paragraphs:

"It is respectfully submitted that the Tobise reference does not teach the claimed limitations of the present invention, and in fact this cited reference specifically teaches away from the claims of the present invention.

The present invention is directed to a reduced sensitivity spin valve sensor, as emphasized in the language of claim 1, above: "...to thereby reduce a sensitivity of a free layer of the spin valve sensor to applied magnetic fields." [Emphasis added.] Also, the present specification states this intended goal in several places."

The Examiner respectfully points out that Tobise shows figure 3, that his invention has a reduced sensitivity compared to the comparative Example (prior art). It is noted that the output of a spin valve sensor is directly related to the sensitivity of the free layer where a lower output correspond to a less sensitive free layer.

Appellant asserts in page 7:

"Applicant respectfully submits that the term "reduced sensitivity spin valve sensor" in claim 1 is not the only description of reducing spin valve sensitivity shown in claim 1. More specifically, Claim 1, as emphasized above, claims, "wherein the at least one magnetic effect inducing device induces a magnetic field to the spin valve sensor to

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thereby reduce a sensitivity of a free layer of the spin valve sensor to applied magnetic fields." Hence, the language of claim 1 does in fact specify what part of the spin valve has its sensitivity reduced--a free layer of the spin valve sensor, as recited. This is not mere preamble language, and is presented in the body of the claim, and is intended as a limitation describing the scope of the present invention. Therefore, the cited references, in order to anticipate the present claims, must show this limitation, in the context of the present claims. As argued above, the Tobise reference does not teach this limitation, and instead teaches an increased sensitivity spin valve sensor."

It is the position of the Examiner that Tobise address the preamble of the claim by showing that his invention has a reduced sensitivity with respect to a prior art sensor (figure 3) and that the free layer has a reduced sensitivity due to a magnetic effect inducing device 21 (figure 15) and explained in detail in column 12, lines 50-54.

Appellant asserts in pages 8-9:

"It is respectfully submitted that Miyauchi fails to teach the limitations of the present claims. It is also directed to a different problem than the present application, and also explicitly teaches away from the presently claimed invention. Examiner cites Miyauchi, against independent claims 1 and 11. Claim 1 is reproduced above. In rejecting claim 1, Examiner cites Miyauchi at col. 7, lines 58-64:

While the exchange bias magnetic field applied by the magnetic domain control film 126 is required to have a magnitude that is large enough to create a single magnetic domain in the first ferromagnetic film 121 in, for instance, direction (X), if it becomes too large, the reversal of magnetization of the first ferromagnetic film 121 is dulled, reducing the magnetic field sensitivity. Consequently, it is desirable to set the exchange bias magnetic field applied by the magnetic domain control film 126 at the minimum whereby a single magnetic domain can be achieved in the first ferromagnetic film.

Rather than anticipating the present invention, Applicant respectfully submits that this passage teaches away from the ideas of the present invention, specifically claim

1. The above passage of Miyauchi teaches that the bias field is too large, magnetic field sensitivity is reduced. Miyauchi then goes on to explain why this is undesirable, and offers a solution to prevent such a situation from occurring. Rather than expressly reducing sensitivity by providing a magnetic effect inducing device, Miyauchi teaches that such sensitivity must not be reduced, and that this can be accomplished according to Miyauchi's teachings of keeping the bias field at a minimum. This directly contradicts the claims of the present invention, which uses a magnetic effect inducing device reduces the sensitivity of the free layer. Hence, it is respectfully submitted that Miyauchi fails to teach the limitations of at least claim 1, specifically, "wherein the at least one magnetic effect inducing device induces a magnetic field to the spin valve sensor to-thereby reduce a sensitivity of a free layer of the spin valve sensor to applied magnetic fields." [Emphasis added.]”

The Examiner respectfully points out that Miyauchi et al apply one magnetic effect inducing device (magnetic domain control film 126 in figure 3) to a well known device (a spin valve sensor alone comprising a first ferromagnetic film 121 (free layer), a non-magnetic film 122, a second ferromagnetic film 123 (pinned layer) and an antiferromagnetic film 124 (pinning layer) as disclosed in column 7, lines 18-25). The spin valve sensor alone has a given sensitivity that is greater than the spin valve sensor laminated with the magnetic domain control film 126 due to the fact that the exchange bias magnetic field applied to the free layer 121 by the magnetic domain control film 126 is at a right angle to the direction of the exchange bias magnetic field applied by the antiferromagnetic film 124, therefore the spin valve sensor of

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Miyauchi (that includes a magnetic domain control film) has a reduced sensitivity compared to a spin valve sensor alone.

Applicant asserts in page 10:

“It is respectfully submitted that the prior art structure is not capable of performing the intended use of the present invention.”

The Examiner points out that the intended use of the present invention is not in the claims.

For the above reasons, it is believed that the rejections should be sustained.

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Respectfully submitted,



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May 14, 2004

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